WG1N5327 - Medical image database for lossless codec evaluation

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ISO/IEC JTC1/SC29/WG1
(ITU-T SG8)

Coding of Still Pictures

JBIG
Joint Bi-level Image Experts Group

JPEG
Joint Photographic Experts Group

TITLE: **Medical image database for lossless codec evaluation.**

SOURCE: **CAïMAN ANR project**

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PROJECT: **Medical image database - AIC**

STATUS:

REQUESTED ACTION: **For review and discussion**

DISTRIBUTION: **WG 1 members**

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Introduction

This document describes the CAIMAN ANR project contribution on medical images to be considered for AIC. In order to evaluate the medical image codec, we have compiled a list of medical image (X-ray, CT, MRI) for the development and analysis of medical image compression scheme. All images can be found on a secure FTP server, and can be use freely for research purpose.

The data included in this database can be used, free of charge, for research and educational purposes. Redistribution and commercial use is prohibited. Any researcher reporting results which use this database must acknowledge the original provider of used data.

The secure FTP server access is only available on demand (send an e-mail to lbedat@insa-rennes.fr) and only for WG1 members.

All images are providing in ascii PGM format. We can provide the C source code appropriate to open this image format.

Magnetic Resonance Images

ICBM collection: International Consortium for Brain Mapping. ICBM page.
Brain MRA Images from this collection have to be downloading from LONI server. We have selected 4 sets (187 images/set):

Series ID	*Modality*	*Description*	*file format*	*Image size*	*resolution*
UCLA_1085	MRA	tof_fi3d_tra-Multislab	DCM	288 x 320	10 bpp
UCLA_1074	MRA	tof_fi3d_tra-Multislab	DCM	288 x 320	10 bpp
UCLA_1017	MRA	tof_fi3d_tra-Multislab	DCM	288 x 320	10 bpp
UCLA_1013	MRA	tof_fi3d_tra-Multislab	DCM	288 x 320	10 bpp

Direct links are available on our sftp server. ICBM usage privilege has to be grant before any access. See ICBM data use agreement for usage and citation policies.
To convert DCM image, you can download DCM2PGM (win32 executable, source code are available on demand) tools from our sftp server (this tool is locate in /medical-Images/tools/dcm2pgm/). See README file for usage instruction.

NCRI collection: UK National Cancer Research Institute. NCRI page.
A subset of colorectal MRI Images could be downloading from our sftp server. We have selected 12 series (176 images, 12bpp Gray level).

Studies ID	*Type*	*Image size*	*Pixel resolution*	*images*
FPH113	localizer	512 x 512	12 bpp	5
FPH113	t2_tse_sag	512 x 384	12 bpp	19
FPH113	t2_tse_tra	304 x 512	12 bpp	23
FPH114	localizer	512 x 512	12 bpp	5
FPH114	t2_tse_sag	512 x 384	12 bpp	19
FPH114	t2_tse_tra	304 x 512	12 bpp	19
FPH118	localizer	512 x 512	12 bpp	5
FPH118	t2_tse_sag	512 x 384	12 bpp	19
FPH118	t2_tse_tra	304 x 512	12 bpp	19
FPH309	localizer	512 x 512	12 bpp	5
FPH309	t2_tse_sag	512 x 384	12 bpp	19
FPH309	t2_tse_tra	304 x 512	12 bpp	19

The use of data from this collection in publications, imply to credit the *National Cancer Research Institute* as the source of the data, and reference:
The colorectal MRI collection is made available from the National Cancer Research Institute in collaboration with caBIG.

TCGA collection:. TCGA page.
A subset of brain MRI Images could be downloading from our sftp server. We have selected 4 series (213 images, 12bpp Gray level).

Studies ID	*Type*	*Image size*	*Pixel resolution*	*images*
306	COR T1 POST GD FLAIR	512 x 512	16 bpp	39
354	AX T1 pre gd	512 x 512	16 bpp	69
490	AX T1 pre gd	512 x 512	16 bpp	36
842	AX T1 pre gd	512 x 512	16 bpp	69

The use of data from **TCGA** collection in publications, imply credit the The Cancer Genome Atlas Pilot Project (TCGA) as the source of the data, and reference:
The results published here are in whole or part based upon data generated by The Cancer Genome Atlas Pilot Project established by the NCI and NHGRI. Information about TCGA and the investigators and institutions who constitute the TCGA research network can be found at http://cancergenome.nih.gov.

Computed Tomography

RIDER Lung CT - NBIA Collections Page.
Reference Image Database to Evaluate Response. Image archive of CT lung cancer patients followed during treatment.
A subset of Lung CT Images could be downloading from our sftp server. We have selected 4 series (1005 images, 512x512 pixels, 12bpp Gray level).

Studies ID	*Image size*	*Pixel resolution*	*images*
RLCT209868	512 x 512	12 bpp	245
RLCT243509	512 x 512	12 bpp	290
RLCT314333	512 x 512	12 bpp	249
RLCT895032	512 x 512	12 bpp	221

The use of data from **RIDER Lung CT** collection in publications, imply to credit the *Memorial Sloan-Kettering Cancer Center* as the source of the data, and reference:
The Lung CT collection is made available from the Memorial Sloan-Kettering Cancer Center collection in collaboration with the RIDER pilot project.

Virtual Colongraphy - NBIA Collections Page.
A subset of Virtual Colongraphy Images could be downloading from our sftp server. We have selected 8 series (3288 images, 512x512 pixels, 16bpp Gray level).

Studies ID	*Image size*	*Pixel resolution*	*images*
VC-001 6268	512 x 512	16 bpp	423
VC-001 6590	512 x 512	16 bpp	410
VC-002 6888	512 x 512	16 bpp	486
VC-002 7289	512 x 512	16 bpp	434
VC-003 7803	512 x 512	16 bpp	400
VC-003 8205	512 x 512	16 bpp	387
VC-004 11878	512 x 512	16 bpp	388
VC-004 12217	512 x 512	16 bpp	360

The use of data from Virtual Colongraphy collection in publications, imply to credit the *Walter Reed Army Medical Center* as the source of the data, and reference:
The Virtual Colongraphy collection is made available from the Walter Reed Army Medical Center Virtual Colonoscopy Collection in collaboration with the National Cancer Institute, NIH. The data has been provided courtesy of Dr. Richard Choi, Virtual Colonoscopy Center, Walter Reed Army Medical Center, Washington, DC.

CT Colonography - NBIA Collections Page.
A subset of CT Colonography Images could be downloading from our sftp server. We have selected 6 series (3296images, 512x512 pixels, 12 bpp Gray level).

Studies ID	*Image size*	*Pixel resolution*	*images*
CTCOL-0001	512 x 512	12 bpp	625
CTCOL-0002	512 x 512	12 bpp	618
CTCOL-0003	512 x 512	12 bpp	653
CTCOL-0004	512 x 512	12 bpp	520
CTCOL-0005	512 x 512	12 bpp	401
CTCOL-0006	512 x 512	12 bpp	479

The use of data from CT Colonography collection in publications, imply to credit the *American College of Radiology Imaging Network* as the source of the data, and reference:
The CT Colonography *collection is made available from the American College of Radiology Imaging Network in collaboration with the National Cancer Institute & NBIA.*

Positron Emission Tomography

RIDER Lung PET CT - NBIA Collections Page.
A subset of Lung PET CT Images could be downloading from our sftp server. We have selected 4 series (833images, 128 x 128 pixels, 16 bpp Gray level).

Studies ID	*Image size*	*Pixel resolution*	*images*
RLPETCT200766	128 x 128	16 bpp	267
RLPETCT261403	128 x 128	16 bpp	171
RLPETCT261404	128 x 128	16 bpp	171
RLPETCT956858	128 x 128	16 bpp	224

The use of data from RIDER Lung PET CT collection in publications, imply to credit the *UNIVERSITY OF WASHINGTON* as the source of the data, and reference:
The Lung PET CT collection is made available from the UNIVERSITY OF WASHINGTON collection in collaboration with the RIDER project.

X-Ray

CT Colonography - NBIA Collections Page.
A subset of X-Ray Images could be downloading from our sftp server. We have selected 38 images (512x512 pixels, 12 bpp Gray level).

The use of data from CT Colonography collection in publications, imply to credit the *American College of Radiology Imaging Network* as the source of the data, and reference:

The CT Colonography *collection is made available from the American College of Radiology Imaging Network in collaboration with the National Cancer Institute & NBIA.*

RIDER pilot - NBIA Collections Page.
A subset of Chest X-Ray Images could be downloading from our sftp server. We have selected 108 digital X-ray images (2022 x x 2022 pixels, 14 bpp Gray level) and 15 scanned X-ray images (2140 x 1760, 10 bpp gray level).
The use of data from **RIDER pilot** collection in publications, imply to credit the as the source of the data, and reference:
The Chest X-Ray *collection is made available from the MD Anderson Cancer Center collection in collaboration with the RIDER pilot project.*

NHANES II, from National Health and Nutrition Examination Survey II.
Two subsets of cervical and lombar X-ray Images could be downloading from our sftp server. We have selected a set of 50 cervical X-ray Images (1463 x 1755 – 12 bpp) and a set of 100 lumbar X-ray Images (2048 x 2487 - 12 bpp).

For attribution, use: *Image data from National Health and Nutrition Examination Survey II (NHANES II), U.S. National Center for Health Statistics, Hyattsville, MD, as distributed by the National Library of Medicine".*

Mini-MIAS, Mammographic Image Analysis Society. Mini-MIAS.
A subset of Mammographic Images could be downloading from our sftp server. We have selected a set of 100 images (1024 x 1024, 8 bpp).

The use of data from **MIAS** in publications, imply to credit the **MIAS** society as the source of the data, and reference:
J Suckling et al (1994) "The Mammographic Image Analysis Society Digital Mammogram Database" Exerpta Medica. International Congress Series 1069 pp375-378.

DDSM: Digital Database for Screening Mammography. USF DDSM Homepage.
Two subsets of mammography X-ray Images could be downloading from our sftp server. We have selected a set of 8 mammography Images (2200 x 4800 – 12 bpp &16 bpp). 2620 cases available in 43 volumes are available on DDSM server, nevertheless the used image format is a non standard JPEG-LS. Image from Case 1000 to 1017 (volume cancer_03) and case 4500 to 4517 (Volume: normal_07) have been converted and will be upload on DDSM server soon.

If I use data from DDSM in publications, please credit the DDSM project as the source of the data, and reference:

- *Michael Heath, Kevin Bowyer, Daniel Kopans, Richard Moore and W. Philip Kegelmeyer, "The Digital Database for Screening Mammography", in Proceedings of the Fifth International Workshop on Digital Mammography, M.J. Yaffe, ed., 212-218, Medical Physics Publishing, 2001. ISBN 1-930524-00-5.*
- *Michael Heath, Kevin Bowyer, Daniel Kopans, W. Philip Kegelmeyer, Richard Moore, Kyong Chang, and S. MunishKumaran, "Current status of the Digital Database for Screening Mammography", in Digital Mammography, 457-460, Kluwer Academic Publishers, 1998; Proceedings of the Fourth International Workshop on Digital Mammography.*

Also, please send a copy of your publication to Professor Kevin Bowyer / Computer Science and Engineering / University of Notre Dame / Notre Dame, Indiana 46530, USA.